WHAT'S YOUR COLOR?

Suggested Grades

4, 5

SD Mathematics Strand & Standard *(Primary for Task)*

Statistics and Probability

5.S.2.2 Use models to display possible outcomes

Task Summary

Students' examine bags of candy to make reasonable predictions, chart data and make comparisons.

Time and Context of Task

1 class period

Materials Needed

M&M candy - large and small bags, paper, pencils, graph paper

Author and Lead Teacher for the Task

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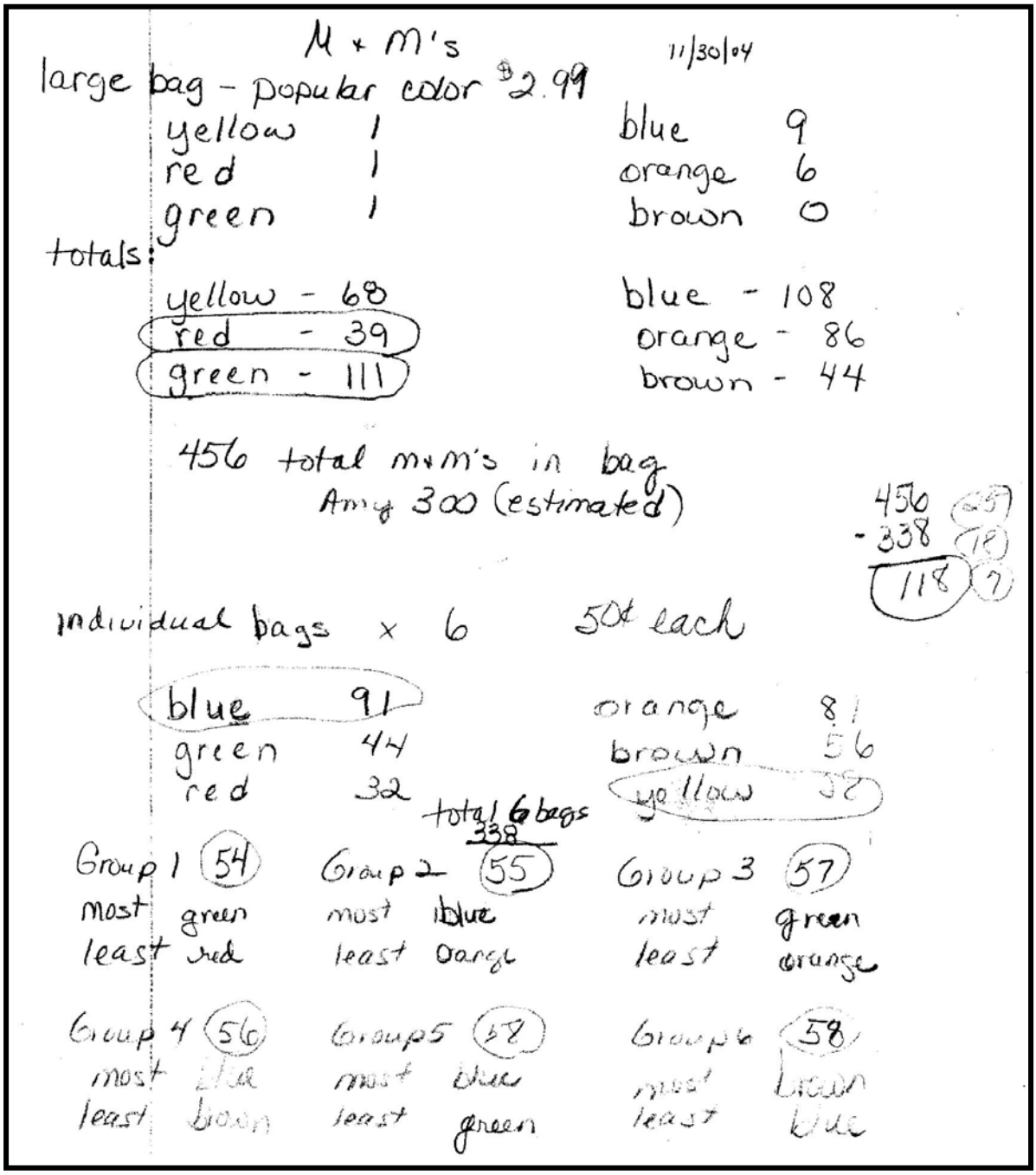
WHAT'S YOUR COLOR

Students will take a large bag of M&M' s, and before opening try to predict the color and number of M&M's in the bag. Using Graph Paper, they will arrange the colors, count them, and compare the results with their predictions. Students are then given 6 small bags of M&M's and see if their predictions and outcomes match those of the larger bag.

Original Data Set



CONTENT STANDARDS

Primary Standard for the Task

Strand Name: Statistics and Probability
SD Goal: Students will apply statistical methods to analyze data and explore probability for making decisions and predictions.
Indicator: Apply the concepts of probability to predict outcomes and solve problems
Standard: 5.S.2.2 Use models to display possible outcomes

NCTM Process Standards

Problem-solving,

- Build new mathematical knowledge through problem solving
- Apply and adapt a variety of appropriate strategies to solve problems

Communication

- Communicate their mathematical thinking coherently and clearly to teachers, peers, and others

Representation

- Create and use representations to organize, record, and communicate mathematical ideas

Problem-Solving Strategies

- Estimation and check
- Drawing pictures, graphs, and tables
- Acting out the problem
- Looking for patterns
- Use of manipulatives

ASSESSMENT TOOLS

Task Rubric

Standard	Advanced	Proficient	Basic	Below Basic
5.S.2.2 Use models to display possible outcomes	Students' predictions and results are within a consistent range. Their graphs and results are accurate, and they have made logical and accurate comparisons between the two sized bags.	Students' predictions are reasonable. Their graphs and charts are accurate. They have tried to make comparisons between the two sizes of bags.	Students' have made some predictions, graphs are incomplete, and a comparison is made, though made be inaccurate.	Student predictions are not consistent with the task. Their sorting and counting may not be accurate, and their comparisons are incorrect or missing.

Additional rubrics can be retrieved from K-12 Exemplars.com
http://www.exemplars.com/resources/rubrics/assessment.html

Fifth Grade Statistics & Probability
Performance Descriptors

Advanced	**Fifth grade students performing at the advanced level:** • interpret data from graphs to solve problems; • when given the mean, find the missing number in a data set; • give the probability as a ratio; • predict possible outcomes**.**
Proficient	**Fifth grade students performing at the proficient level:** • gather, graph, and interpret data; • calculate and explain mean for a whole number data set; • classify probability as certain, likely, unlikely.
Basic	**Fifth grade students performing at the basic level:** • identify data from simple graphs; • recognize probability as certain or impossible.

Fifth Grade Statistics & Probability
ELL Performance Descriptors

Proficient	**Fifth grade ELL students performing at the proficient level:** • represent data in line and bar graphs given appropriate scales; • recognize possible outcomes as certain, likely, or unlikely; • read, write, and speak the language of mathematics.
Intermediate	**Fifth grade ELL students performing at the intermediate level:** • interpret data from line and bar graphs; • find mean in given basic data sets; • recognize possible outcomes as certain or impossible; • read and answer directed questions about graphs; • explain in mathematical terms the sequence of steps used in solving problems; • give simple oral or written responses to directed questions on topics presented in class.
Basic	**Fifth grade ELL students performing at the basic level:** • recognize and use basic statistics and probability terms; • respond to yes or no questions and to problems presented pictorially or numerically in class.
Emergent	**Fifth grade ELL students performing at the emergent level:** • imitate pronunciation of statistics and probability terms; • use non-verbal communication to express mathematical ideas.
Pre-emergent	**Fifth grade ELL students performing at the pre-emergent level:** • observe and model appropriate cultural and learning behaviors from peers and adults; • listen to and observe comprehensible instruction and communicate understanding non-verbally.

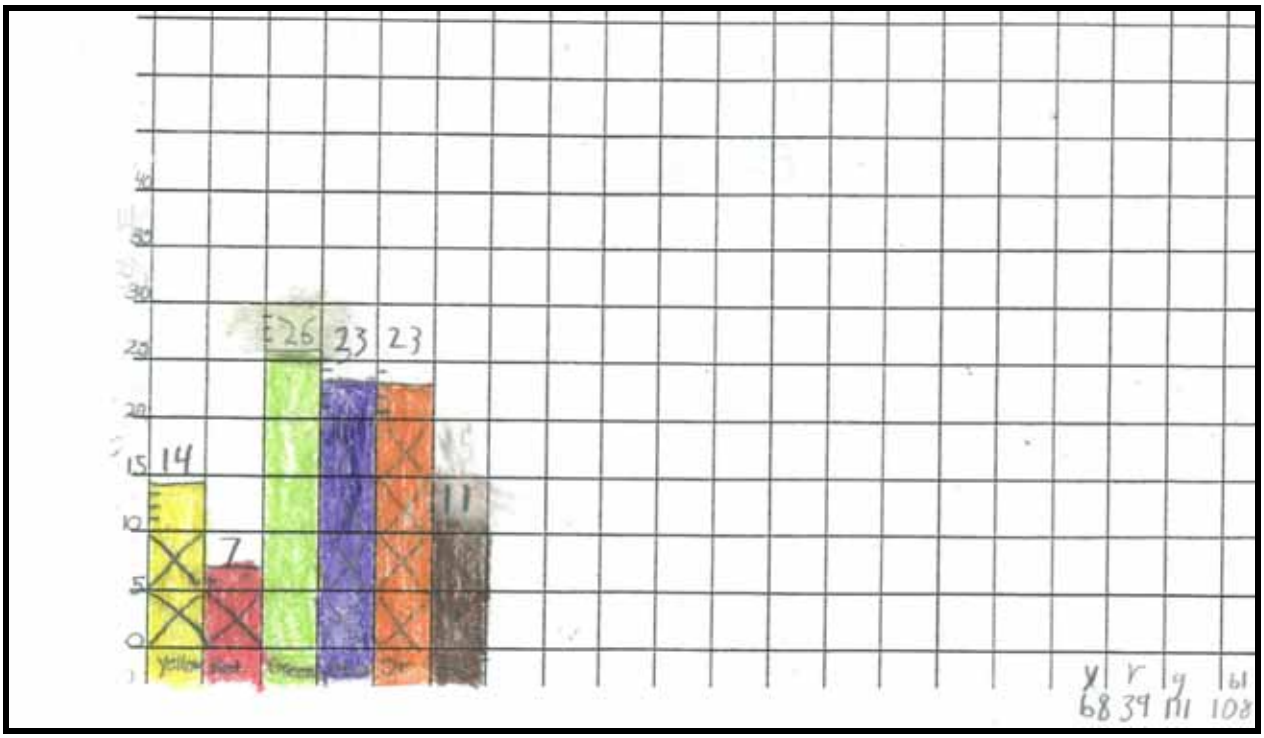
WHAT'S YOUR COLOR?

Student Work Samples

As you examine the samples, consider the following questions:

- In light of the standard/s addressed and the assessment tools provided, what evidence does the work provide that students are achieving proficiency in the knowledge and skills addressed by the standard/s for the task?
- Is the task/activity well designed to help students acquire knowledge and demonstrate proficiency? Is the task/activity clearly aligned with the standards? In what ways would you adapt the task/activity to better meet the needs of your students?

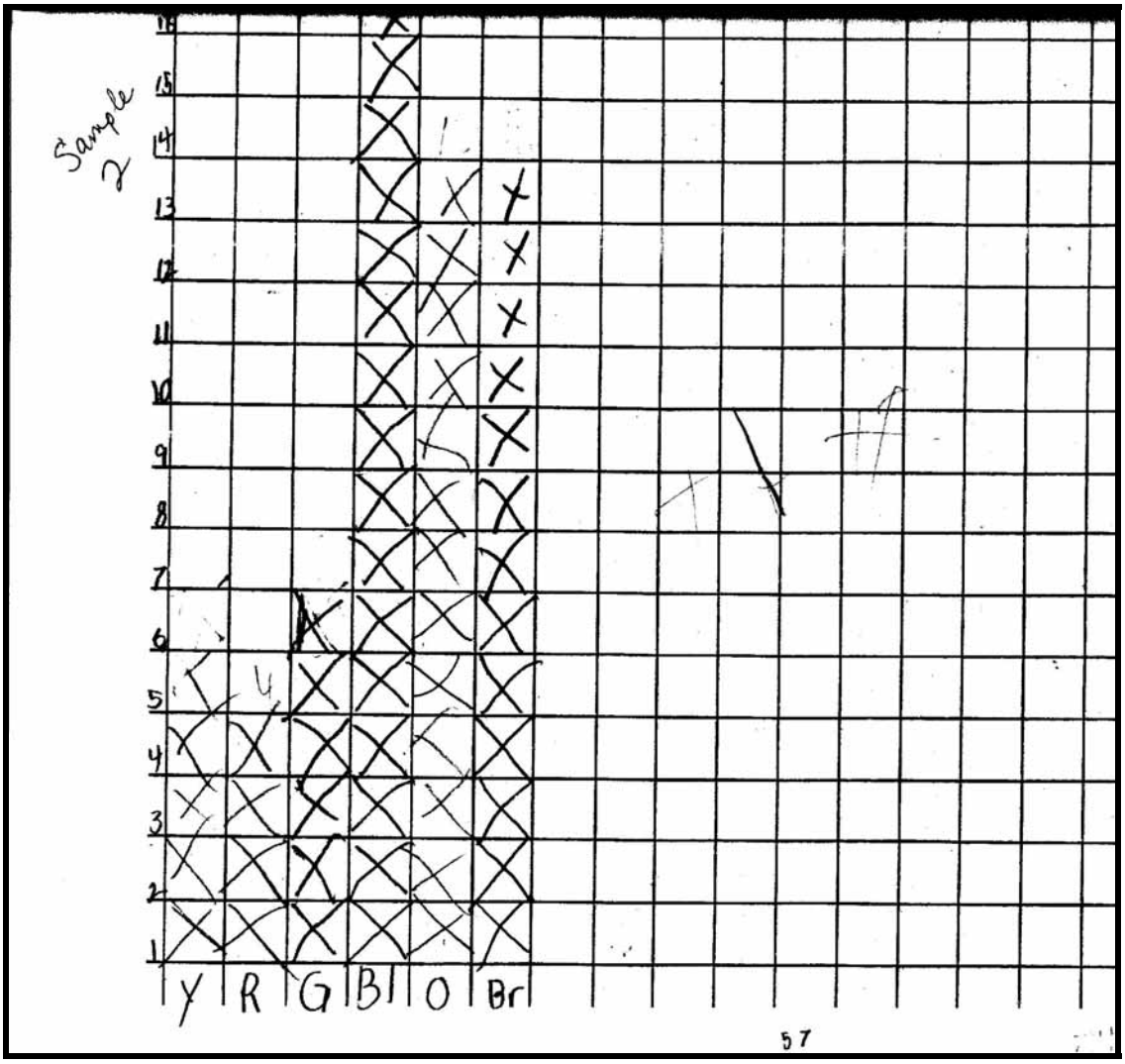
Student Work Sample #1
Page 1



Looking at Student Work – Instructor notes and rating for work sample #1:

Advanced. Students were able to see the correlation, and included the classroom data in the corner of the graph for comparative purposes. The students used a reasonable scale, color, and correct data to create their chart.

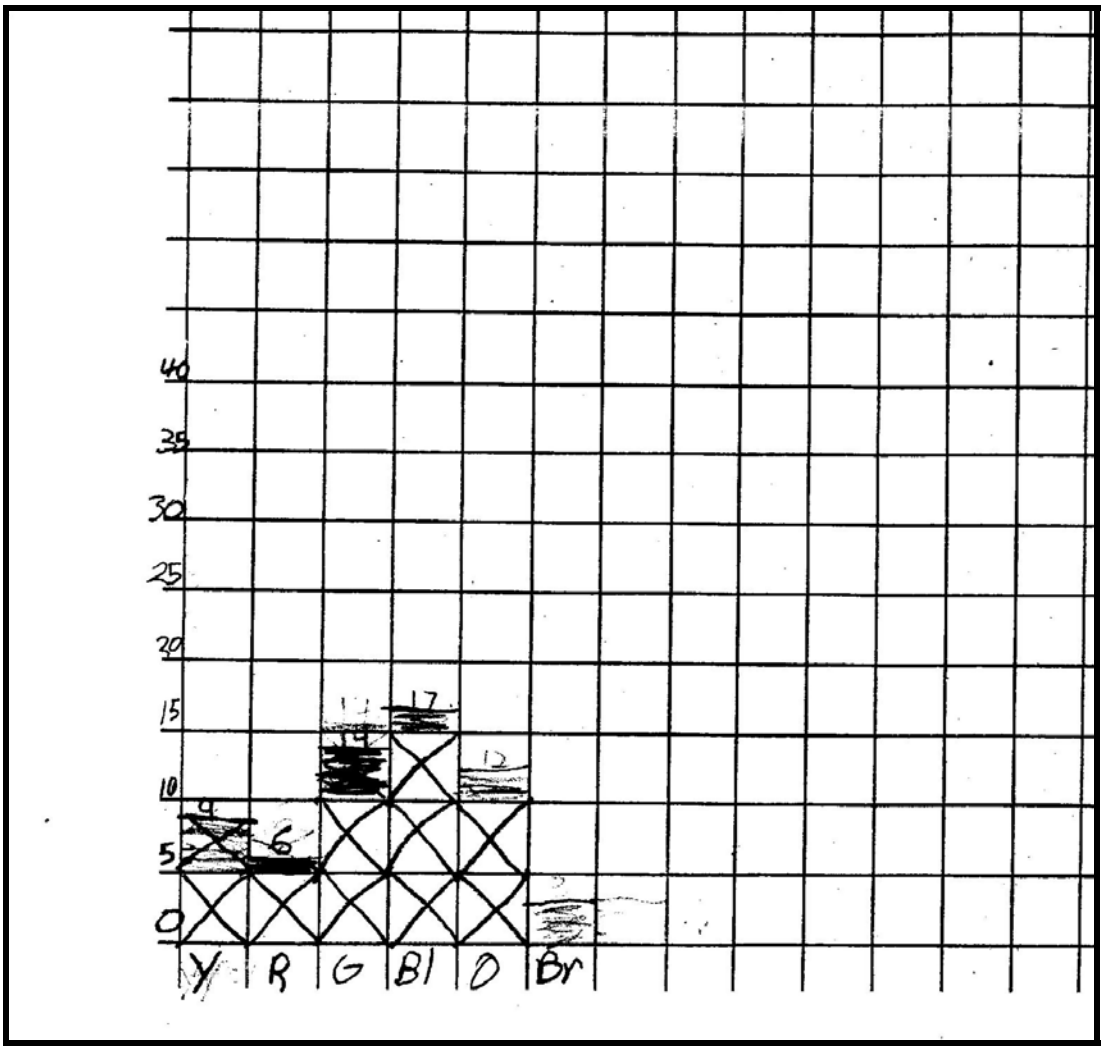
Student Work Sample #2



Looking at Student Work – Instructor notes and rating for work sample #2:

Proficient. Students graphed the data in a bar graph with accurate measures and scale. The students drew a verbal correlation between the large bag and the small bags

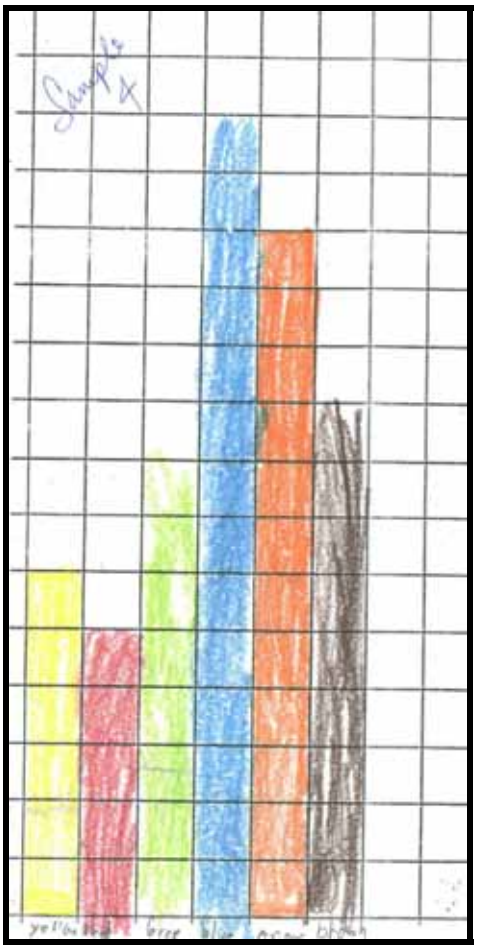
Student Work Sample #3

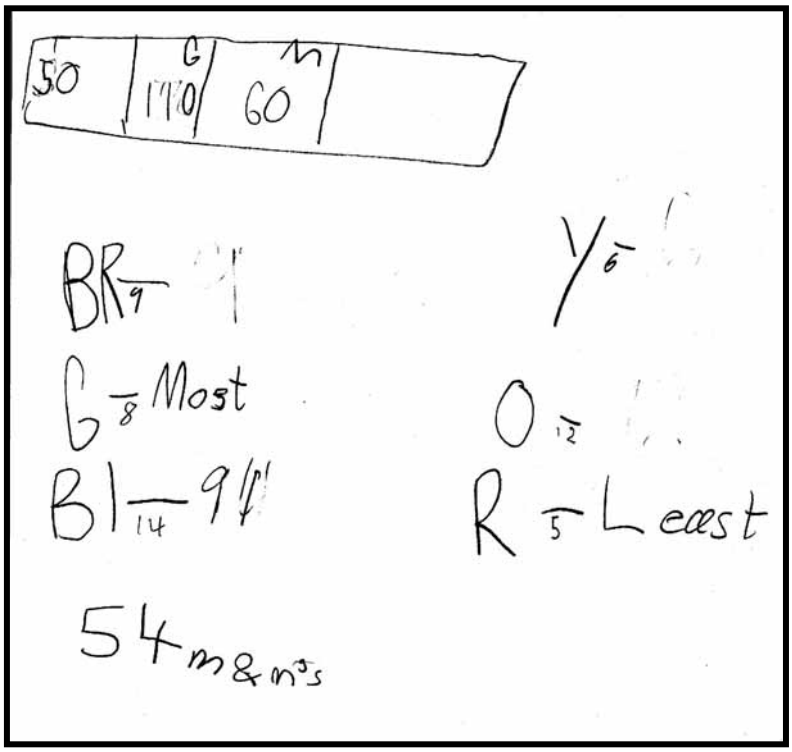


Looking at Student Work – Instructor notes and rating for work sample #3:

Basic. Student data was correct, but the scale did not lend itself to a good model of data represented.

Student Work Sample #4
Page 1





Looking at Student Work – Instructor notes and rating for work sample #4:

Below Basic. Students did not label graphs or draw comparisons to classroom data.

INSTRUCTIONAL NOTES

Author Comments

Students were given the data on the teacher sheet as a group project, and this was graphed on the board as a large group.

Task Extensions

The task needed more time and could have been done in excel to create a comparative bar graph.

Common Strategies

Students did a good job of predicting the results, using prior estimation skills.

Common Misunderstandings

Students had a hard time seeing a correlation between the bags. If we had a larger sample, the correlation would have been greater statistically.

Resources

SD Mathematics Content Standards
http://www.doe.sd.gov/contentstandards/math/index.asp

SD Assessment and Testing
http://www.doe.sd.gov/octa/assessment/index.asp

The National Assessment of Educational Progress (NAEP)
http://www.doe.sd.gov/octa/assessment/naep/index.asp

National Council of Teachers of Mathematics
http://nctm.org/

Looking at Student Work
http://www.lasw.org/index.html